FIGS. **30**A–**30**D, **31**A–**31**D and **32**A–**32**D show examples of high-speed aircraft embodiments **1000**–**1000'** that use alternative embodiments of the nested core engines in a lift-fan configuration, deriving benefit from the short axial length of the nested core engines. Alternative aircraft embodiments can be made using the nested core engines in similar aircraft configurations.

What is claimed is:

1. An ultra-high bypass engine comprising:

an air breathing gas turbine engine; and

a fan section operably connected to the air breathing gas turbine engine so that exhaust gases from the air breathing gas turbine engine impinge on at least a portion of the fan section for driving the fan section;

wherein the air breathing gas turbine engine comprises:

a combustion chamber section;

a turbine section surrounding the combustion chamber section so that the combustion chamber section is nested at least in part within the turbine section, a rotor portion of the turbine section forming at least part of the combustion chamber section; and

a compressor section surrounding the turbine section, the compressor section having two or more spools, capable of rotation independent of one another.

2. The ultra-high bypass engine according to claim **1**, wherein the fan section has a rotatable plenum interfacing with an exhaust of the air breathing gas turbine engine.

3. The ultra-high bypass engine according to claim **1**, wherein the fan section has hollow fan blades defining passages through which the exhaust gasses are directed for driving the fan blades.

4. The ultra-high bypass engine according to claim **3**, wherein the passages are connected to aft facing tip jets in the fan blades so that the exhaust gasses are effluxed through the tip jets.

5. The ultra-high bypass engine according to claim **3**, wherein the passages are connected to aft facing slots on the fan blades so that the exhaust gasses are effluxed through the slots.

6. A turbofan comprising:

an engine; and

a fan operably connected to the engine so that the fan is powered by the engine, the fan having fan blades with slots formed therein, the slots having openings facing substantially aft relative to a rotational direction of the fan, wherein torque for rotation of the fan is provided at least in part by engine exhaust issuing from the slots, and wherein the engine exhaust issuing from the slots contributes to the aerodynamic performance of the fan blades to enhance the aerodynamic performance of the fan blades.

7. The turbofan according to claim **6**, wherein the openings of the slots are located on an upper surface of the fan blades.

8. The turbofan according to claim **6**, wherein the fan engine is a turbofan.

9. The turbofan according to claim **6**, wherein the engine is an air breathing gas turbine engine comprising:

a combustion chamber section;

a turbine section surrounding the combustion chamber section so that the combustion chamber section is nested at least in part within the turbine section, a rotor portion of the turbine section forming at least part of the combustion chamber section; and

a compressor section surrounding the turbine section;

wherein the compressor section has two or more spools, capable of rotation independent of one another.

10. A turbofan comprising:

an engine; and

a fan operably connected to the engine so that the fan is powered by the engine, the fan having fan blades with engine exhaust nozzles formed therein, the engine exhaust nozzles being located at or near the tip of the fan blades and facing substantially aft relative to a rotational direction of the fan, wherein torque for rotation of the fan is provided at least in part by engine exhaust issuing from the engine exhaust nozzles, and wherein the engine exhaust issuing from the engine exhaust nozzles contributes to the aerodynamic performance of the fan blades to enhance the aerodynamic performance of the fan blades.

11. A turbofan comprising:

an engine; and

a fan operably connected to the engine so that the fan is powered by the engine, the fan having fan blades engine with slots and nozzles formed therein, the slots having openings facing substantially aft relative to a rotational direction of the fan, and the nozzles being located at or near the tip of the fan blades and facing substantially aft relative to a rotational direction of the fan, wherein torque for rotation of the fan is provided at least in part by engine exhaust issuing from the nozzles, and wherein the engine exhaust issuing from the slots contributes to the aerodynamic performance of the fan blades to enhance the aerodynamic performance of the fan blades.

12. The turbofan according to claim **11**, wherein the openings of the slots are located on an upper surface of the fan blades.

13. The turbofan according to claim **11**, wherein torque for rotation of the fan is provided by a combination of engine exhaust issuing from the nozzles and engine exhaust issuing from the slot openings.

14. The turbofan according to claim **13**, wherein the openings of the slots are located on an upper surface of the fan blades.

15. A turbofan comprising:

a gas turbine engine; and

a fan operably connected to the gas turbine engine so that the fan is driven directly by exhaust of the gas turbine engine, wherein torque rotating the fan is provided by engine exhaust issuing from fan blade nozzles pointed aft, relative to a rotation direction of the fan, and located at or near a tip of fan blades of the fan.

16. A turbofan comprising:

a gas turbine engine; and

a fan operably connected to the gas turbine engine so that the fan is driven directly by exhaust of the gas turbine engine, wherein torque rotating the fan is generated by engine exhaust issuing from fan blade slots with engine exhaust openings facing aft, relative to a rotation direction of the fan.

17. The turbofan according to claim **16**, wherein the engine exhaust openings of the fan blade slots are formed in an upper surface of fan blades.

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